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NATIONAL AERONAUTICS
AND SPACE ADMINISTRATION

NASA-09915 (March 2003)
NASA - KSC
Superseding NASA-09915
(September 1999)

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DIVISION 09 - FINISHES

SECTION 09915

PROTECTIVE COATING OF ALUMINUM

03/03

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NASA-09915 (March 2003)
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SECTION 09915

PROTECTIVE COATING OF ALUMINUM
03/03

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NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the final project specification.

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Designer shall prepare the coating schedule (paragraph entitled "Coating Schedule") indicating the areas to be coated, surface preparation, and finish color required.

This section covers coating systems, materials, surface preparation, and application of protective coatings on aluminum.

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PART 1 GENERAL

1.1 REFERENCES

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NOTE: The following references should not be manually edited except to add new references. References not used in the text will automatically be deleted from this section of the project specification.

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The publications listed below form a part of this section to the extent referenced:

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC SP 1 (1982) Solvent Cleaning

U.S. DEPARTMENT OF DEFENSE (DOD)

MS DOD-P-15328 (Rev D; Am 1) Primer (Wash), Pretreatment

(Formula No. 117 For Metals) (Metric)

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FED-STD 595	(Rev B) Colors Used in Government Procurement
FS TT-S-00230	(Rev C; Am 2) Sealing Compound: Elastomeric Type, Single Component, (for Calking, Sealing, and Glazing in Buildings and Other Structures)

1.2 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01330, "Submittals," and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control. Include a columnar list of appropriate products and tests beneath each submittal description.

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The following shall be submitted in accordance with Section 01330, "Submittals," in sufficient detail to show full compliance with the specification:

SD-01 Preconstruction Submittals

Inspection Forms shall be submitted for protective coating of aluminum in accordance with paragraph entitled, "General Requirements," of this section.

Material, Equipment, and Fixture Lists shall be submitted in accordance with paragraph entitled, "General Requirements," of this section.

SD-09 Manufacturer's Field Reports

Inspection reports shall be submitted for protective coating systems in accordance with the paragraph entitled, "Inspection," of this section.

1.3 DELIVERY, HANDLING AND STORAGE

Materials shall be delivered in their original, unbroken containers bearing the manufacturer's name, product identification, and batch number.

Coatings, thinners, and cleaners shall be stored in tightly closed containers in a covered, well-ventilated area where they will be protected from exposure to extreme cold or heat, sparks, flame, direct sunlight, or rainfall.

1.4 PROTECTION OF EQUIPMENT AND ADJACENT SURFACES

All equipment and adjacent surfaces shall be protected from damage such as, but not limited to, abrasive intrusion, overblast, and overspray.

1.5 PERSONNEL SAFETY

Necessary precautions shall be taken in accordance with OSHA regulations to ensure safety of personnel engaged in these operations and personnel who may be affected by such operations. Some of the materials to be handled under this specification are combustible or toxic, or both. Using material safety information provided by the manufacturer, the Contractor shall be responsible for providing equipment as required for safe application and instructing the users regarding the hazards and proper handling procedures to prevent health hazards or possible explosion.

1.6 GENERAL REQUIREMENTS

Material, Equipment, and Fixture Lists shall be submitted for installation equipment, protective coating systems, listing all materials to be used on the project. List shall include manufacturer's style or catalog numbers, specification and drawing reference numbers, warranty information, and fabrication site information.

Inspection Forms shall be submitted at the prework conference which shall be used by the Coating Inspector and forwarded to the Contracting Officer prior to delivery of the coated work to the job site.

PART 2 PRODUCTS

2.1 ABRASIVES

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NOTE: When abrasive blasting with silica sand is performed, protective equipment required by NIOSH (National Institute for Occupational Safety and Health) must be used, to assure safety.

The only respirator suitable for use when using silica sand is Type CE, pressure-demand, abrasive blast supplied air respirator, with a protection factor of 2000.

When silica sand is not used as the blasting agent, and when a protection factor of 25 (loose fit hood/helmet) will provide adequate protection than Type CE, continuous flow, abrasive blast supplied air respirator shall be used.

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Abrasive blasting material shall be commercial silica blasting sand (readily available from industrial and commercial sources) for surface preparation METHOD 1; for METHOD 2, nutshells shall be used.

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NOTE: Shellblast (nutshells) is available from Agrashell, Inc., 5934 Keyston Drive, Bath, PA 18014, (215) 837-6705.

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Abrasive discs shall be Scotch Brite Clean 'N Strip discs, or equal.

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NOTE: Abrasive discs are available from 3M Cleaning Products Division, St. Paul, MN 55144, (612) 733-1110.

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Abrasive sanding sheets shall be Tri-M-Ite Wetordry, or equal, and the sanding discs shall be type-D discs, or equal.

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NOTE: Sanding sheets and discs are available from 3M Automotive Trades Division, St. Paul, MN 55144, (612) 733-1110.

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2.2 SEALANT COMPOUND

Sealant shall be a self-curing, single component, polysulfide-rubber type conforming to FS TT-S-00230. Sealant shall be gray in color and capable of being applied into the joint with a calking gun.

2.3 PROTECTIVE COATINGS

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NOTE: No protective coatings are required for normal atmospheric service. In industrial and marine (within two miles of the sea coast) environments, nitrile rubber base aluminum pigmented coating is recommended (KSC Federal stock number 8030-00-485-3656). As an alternative, or when color is required for coding or aesthetics, wash prime in accordance with MS DOD-P-15328, or abrasive blasting and coating with an appropriate protective finish is acceptable.

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Coating system shall be selected from the following listing. No substitution shall be made without the approval of the Contracting Officer. All thinners and cleaners shall be products of the coating manufacturer. Primer and finish coats of the coating system shall be products of the same manufacturer.

System I:

AR-7, Nitrile rubber base, B.F. Goodrich

aluminum pigmented coating — 6061 B.F. Goodrich Blvd.
Jacksonville, FL 32226
(904) 757-3660

System II:

Each successive coating shall be of a contrasting color to provide a visual assurance of complete coverage.

MS DOD-P-15328 — Primer (Wash) Pretreatment (Formula No. 117 for Metals)

INHIBITIVE POLYAMIDE EPOXY PRIMER	ALIPHATIC POLYURETHANE FINISH COAT	MANUFACTURER
Amercoat 182	Amershield	Ameron P.C.D. 201 N. Berry Street Brea, CA 92621 714/529-1951
Carboline 893	Carboline 834	Carboline Company 350 Hanley Industrial Ct. St. Louis, MO 63144 314/644-1000
Devran 205	Devthane 369	Devoe Coatings Company P.O. Box 7600 Louisville, KY 40207 502/897-9861
Corlar 825-Y-9031	Imron 326-Y	DuPont Maintenance Finishes 1007 Market Street Wilmington, DE 19898 800/346-4748
MCR 4361	Hythane 4600	Porter International P.O. Box 1439 Louisville, KY 40201 800/727-2468
Sigma 5434	Sigma 5520	Sigma Coatings 3300 River Road Harvey, LA 70059 504/347-4321
Val-Chem 13-R-62	V40	Valspar Corporation 1401 Severn St. Baltimore, MD 21230 800/638-7756

2.3.1 Finish Colors

Finish colors shall conform to the following FED-STD 595 numbers when

specified in the coating schedule.

Brown (Safety)	No. 10080
Red (Safety)	No. 11105
Red	No. 11136
Yellow (Standard)	No. 13538
Yellow (Safety)	No. 13655
Green	No. 14110
Green (Safety)	No. 14187
Blue (Safety)	No. 15102
Gray (Safety)	No. 16187
Gray	No. 16473
Black	No. 17038
White	No. 17875

PART 3 EXECUTION

3.1 SURFACE PREPARATION

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NOTE: Three methods of surface preparation are described in this section. Specify Method 1 for surface roughening of new aluminum and for removal of corrosion and other surface contaminants from aged aluminum. Specify Method 2 for removal of old coatings from aluminum which is in good condition and has no corrosion. Specify Method 3 for removal of mildew, chalking, and other contaminants from the surface of an existing coating which is in good condition. The required method shall be specified in paragraph entitled "Coating Schedule."

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3.1.1 General

All surfaces to be painted shall be clean, dry, and free from oil, grease, dirt, dust, corrosion, peeling paint, and any other surface contaminants.

Surfaces which will become inaccessible after installation of hardware or components shall be prepared and coated while accessible.

Prepared surfaces shall be coated before recontamination can occur; surface preparation and coating operations shall be sequenced so that freshly applied coatings will not be contaminated by dust or foreign matter.

Compressed air used for surface preparation operations shall be free of moisture and oil.

3.1.2 Methods of Surface Preparation

The following surface preparation methods shall be used when specified in the coating schedule.

3.1.2.1 Method 1

Surface shall be abrasive-blasted with staurolite abrasive sand, (see CAUTION), mechanically cleaned with abrasive discs or hand- or power-sanded with abrasive sanding sheets (approximately 220-grit) or discs (approximately 36-grit). Abrasive blasting shall be used whenever possible. Mechanical cleaning shall be used only when abrasive blasting is impractical; would damage the structure or component, or is prohibited in the area of work. All corrosion and foreign material shall be completely removed and all surfaces slightly roughened. Abrasive blasting material shall not be reused.

CAUTION

ALUMINUM IS SUSCEPTIBLE TO DISTORTION WHEN IT IS ABRASIVE BLASTED WITH SILICA SAND. SPECIAL CARE SHALL BE TAKEN TO ENSURE AGAINST ANY METAL DISTORTION BY REDUCING BLAST NOZZLE PRESSURE AND INCREASING THE WORKING DISTANCE FROM NOZZLE TO SURFACE. IN SOME CASES, SUCH AS IN THE SURFACE PREPARATION OF LIGHT GAGE ALUMINUM SHEET, THESE PRECAUTIONS MAY NOT BE SUFFICIENT TO PREVENT DISTORTION, AND AN ALTERNATE PROCEDURE, SUCH AS SANDING OR MECHANICAL CLEANING PER 3.1.2.1, MUST BE USED.

3.1.2.2 Method 2

Surface shall be abrasive-blasted with nutshells, 14/30 mesh 1.18/0.60 millimeter. All residue shall be completely removed from all surfaces. Abrasive blasting material shall not be reused.

3.1.2.3 Method 3

Surface shall be cleaned with a 5-percent solution of chlorine bleach and shall be washed with water under high pressure (minimum of 1,000 psi) 6900 kilopascal).

3.1.3 Inspection of Surface Preparation

Immediately after the surface has been prepared, it will be inspected by the Contracting Officer to determine compliance with the specification for surface preparation. Any areas not meeting the surface preparation requirements shall be recleaned until approved. No coatings shall be applied until the surface preparation has been approved.

3.2 COATING APPLICATION

Manufacturer's recommendations for thinning, mixing, handling, and applying his product shall be considered a part of this specification. In the event of conflict between the requirements of this specification and the manufacturer's recommendations, this specification shall take precedence.

Compressed air used for spraying coatings shall be free of moisture and oil.

Each coat of material applied shall be free from runs, sags, blisters, and bubbles; variations in color, gloss, and texture; holidays (missed areas); excessive film build; foreign contaminants; dry overspray. Masking shall

be complete and each coat applied shall form a film of uniform thickness.

No coating shall be applied when rain is imminent or when the temperature or humidity is outside the limits recommended by the coating manufacturer.

All coatings shall be thoroughly worked into all joints, crevices, and open spaces.

All newly coated surfaces shall be adequately protected from damage.

Surface temperatures shall be at least 5 degrees F 3 degrees C above the dew point during application to prevent moisture condensation.

All coatings shall be applied by airless or conventional spray. Airless spray shall be used for large surface areas. Conventional spray shall be used for areas of intricate configuration and touchup.

3.2.1 Mixing and Application Procedures

Material shall be thoroughly stirred with a mixing instrument such as a Jiffy Mixer, manufactured by the Jiffy Mixer Company, Inc., San Francisco, California, or approved equal. Mixer shall be powered by an air motor or an explosionproof electric motor.

Mixed material shall be strained through a 30 to 60 mesh 600 to 250 micrometer screen.

Continuous slow agitation shall be provided during application of all coatings to maintain uniform suspension. Continuous rapid agitation shall be avoided.

Material may be thinned for workability and improved spray characteristics only. Only the manufacturers' recommended thinner and amount shall be used.

AR-7 (Nitrile rubber base coating) may be thinned up to 50 percent with the thinner specified.

Spray equipment shall be adjusted to produce an even, wet coat with minimum overspray.

Material shall be applied in even parallel passes, overlapping 50 percent to provide complete and uniform coverage. Special attention shall be given to welds, cutouts, sharp edges, rivets, crevices, and bolts to ensure proper coverage.

Pressure pot, when used, shall be kept at the same level or above the spray gun for proper material delivery.

3.2.2 Dry-Film Thickness (DFT)

Wash primer coating DFT shall be 0.4 to 0.6 mils (4/10,000 to 6/10,000 inch) 0.010 to 0.015 millimeter.

Nitrile rubber base aluminum pigmented coating DFT shall be 3 to 5 mils

(3/10,000 to 5/10,000 inch) 0.008 to 0.013 millimeter.

Polymide epoxy DFT shall be 2.5 to 4 mils (25/10,000 to 4/10,000 inch) 0.006 to 0.010 millimeter.

Aliphatic polyurethane DFT shall be 2 to 4 mils (2/10,000 to 4/10,000 inch) 0.005 to 0.010 millimeter.

3.3 TOUCHUP

Abrasions and scratches shall be touched up as follows:

a. Surface shall be cleaned and degreased per SSPC SP 1.

b. Damaged area shall be sanded lightly with sandpaper to smooth and feather the edges.

c. Finish coats shall be applied to the affected area. Finish coat shall be compatible with existing coatings. A test patch may be required at the option of the Contracting Officer.

Touched-up areas shall blend in with the surrounding coating.

3.4 CALKING

Calking shall be accomplished after application and cure of the primer.

Calking shall be accomplished before application of AR-7, Nitrile rubber base coating.

All exterior exposed joints shall be calked, including but not limited to the following:

a. Perimeter of faying and bearing surfaces of structural members

b. Joints in members between intermittent welds

c. Perimeter of bearing surfaces between floor plates and supporting members (inside, outside, top, and bottom)

d. Stair treads where joined to channel stringers

e. All openings of 1/2 inch 13 millimeter or smaller. Foam filler backup material shall be used as required.

3.5 INSPECTION

[Government will] [Contractor shall] provide inspection reports of all surface preparation and coating applications to ensure the requirements of this specification are fulfilled. Government reserves the right to perform any or all of the inspections set forth in this specification. Inspector shall be a NACE, Level III, certified coating inspector. Inspector shall maintain a daily inspection log, documenting compliance with the Quality Assurance Provisions defined herein. Inspection logs shall be signed and

sealed by the Inspector and submitted to the Contracting Officer. Inspector shall attend the pre-work conference, and shall be responsible for all field work, and coordination of deviation waivers with the Contracting Officer. Contractor shall provide safe access for the Inspector to his work for all inspections.

3.6 COATING SCHEDULE

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NOTE: Designer shall prepare the coating schedule providing the information shown below.

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SURFACE DESCRIPTION	SURFACE PREP METHOD	FINISH COLOR

-- End of Section --